

ABSTRACT

Novel uses of diamondoid-containing materials in the field of microelectronics are
5 disclosed. Embodiments include, but are not limited to, thermally conductive films in
integrated circuit packaging, low-k dielectric layers in integrated circuit multilevel
interconnects, thermally conductive adhesive films, thermally conductive films in
thermoelectric cooling devices, passivation films for integrated circuit devices (ICs), and
field emission cathodes. The diamondoids employed in the present invention may be
10 selected from lower diamondoids, as well as the newly provided higher diamondoids,
including substituted and unsubstituted diamondoids. The higher diamondoids include
tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane,
decamantane, and undecamantane. The diamondoid-containing material may be fabricated
as a diamondoid-containing polymer, a diamondoid-containing sintered ceramic, a
15 diamondoid ceramic composite, a CVD diamondoid film, a self-assembled diamondoid film,
and a diamondoid-fullerene composite.